

# Engineering Data

## Stromberg-Carlson No. 360 Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY  
ROCHESTER, NEW YORK

### ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.
Number and Type of Tubes	{ 2 No. 6K7, 1 No. 6A8, 1 No. 6F8-G, 1 No. 6B8, 1 No. 6H6, 1 No. 6R7, 1 No. 6N7, 2 No. 6F6, 1 No. 6U5, 1 No. 5Z3
Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	See "Apparatus Specifications"
Input Power Rating	140 Watts
Frequency of Intermediate Amplifier	455 Kilocycles

### APPARATUS SPECIFICATIONS

No. 360-M Receiver	50 to 60 Cycles; P-29068 Chassis; P-29072 Speaker
No. 360-MB Receiver	25 to 60 Cycles; P-29069 Chassis; P-29072 Speaker

### CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 360 Radio Receivers are twelve tube, "Electric Tuning", adjustable high fidelity receivers with three tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected).

To properly set up the electric tuning arrangement for the eight favorite broadcast stations, read the section, "Instructions for Setting Up Electric Tuning Arrangement", appearing on page 6 of this book.

When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tube; the stronger a received signal the greater the reduction in the size of the aperture.

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

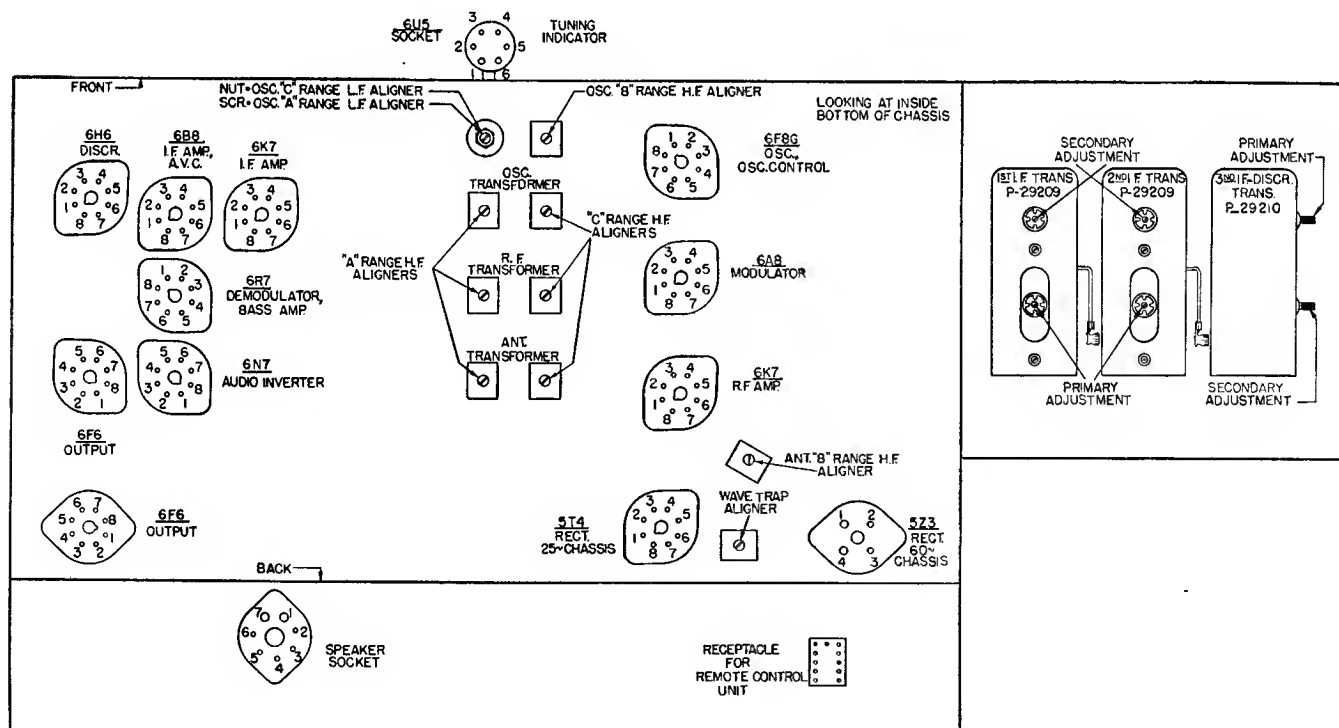


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the Range Switch control knob.

The various tubes are used in these receivers as follows. One No. 6K7 tube is used in the R. F. Amplifier and the other No. 6K7 tube is used in the I. F. Amplifier. The No. 6A8 tube is used as the Modulator tube and the No. 6F8-G tube is used for both Oscillator and Oscillator Control tube. The No. 6B8 tube is used in the I. F. Amplifier and also as the Automatic Volume Control tube. The No. 6H6 tube is used in the Discriminator circuit for Automatic Frequency Control and the No. 6R7 tube is used as the Demodulator and Bass Amplifier tube. The No. 6N7 tube is used as the Phase Inverter tube of the Audio Amplifier Circuit and the two No. 6F6 tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the Tuning Indicator System. The No. 5Z3 tube is the Rectifier tube of the power supply for these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles; models of these receivers designed for operation on a power supply having a frequency of 25 to 60 cycles, use a No. 5T4 tube as the Rectifier tube of the power supply.

### NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used, or when a double asterisk appears the 1000 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+230	+104	0	+82	6.2	0	2-7	6.2
6A8	Modulator	0	0	0	+227	+82	-8.6**	+82	6.2	0	2-7	6.2
6F8-G	Oscillator and Oscillator Control	0	0	0	+172	+8.3	-8.6**	+170	6.2	0	2-7	6.2
6K7	I. F. Amp.	0	0	0	+240	+104	+3.3	0	6.2	+3.3	2-7	6.2
6B8	I. F. Amp. and A. V. C.	0	0	0	+218	0	0	+104	6.2	0	2-7	6.2
6R7	Demodulator and Bass Amp.	0	0	0	+100*	0	0	+25*	6.2	+3.8	2-7	6.2
6H6	Discriminator	—	0	0	0	0	0	0	6.2	0	2-7	6.2
6N7	Audio Inv.	—	0	0	+160	0	0	+155	6.2	+29	2-7	6.2
6F6	Audio Output	—	0	0	+312	+320	0	0	6.2	+19.5	2-7	6.2
6F6	Audio Output	—	0	0	+312	+320	0	0	6.2	+19.5	2-7	6.2
6U5	Tuning Ind.	—	6.2	+12.4	-1.4	+237	-2.8	0	—	—	1-6	6.2
5Z3	Rectifier	—	+435	420	420	+435	—	—	—	—	1-4	4.8
Speaker Socket		—	+415	0	0	+440	+440	0	+320	—		
Voltage Across Motor Winding		22										

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

### ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

## Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

## Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

**CAUTION:** Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:

Secondary of Third I. F.-Discriminator transformer for maximum output.

Primary of Third I. F.-Discriminator transformer for maximum output.

Secondary of Second I. F. transformer for maximum output.

Primary of Second I. F. transformer for maximum output.

Secondary of First I. F. transformer for maximum output.

Primary of First I. F. transformer for maximum output.

Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

## Adjustment of the Discriminator Circuit

1. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.

All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-51. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across C-51 should read zero.

If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above and the secondary adjustment of the Third I. F. Discriminator transformer should be rotated so zero voltage is indicated on the voltmeter connected across C-51.

Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

## Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, all controls should be set at the positions mentioned for the Intermediate Frequency adjustments.

### Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
5. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
6. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2, 3 and 4.

### Alignment of Medium Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

### Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

## Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast position (arrow on knob pointing in direction of gold dot). Push the push button located under the designation "Manual On" and set the tuning dial to 1000 kilocycles.



Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

## INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING SYSTEM

1. Before proceeding with setting up the eight favorite broadcast stations for electric tuning, it is preferable that the radio receiver be turned "on" for approximately twenty minutes. This is accomplished by simply pushing in the push button immediately below the designation, "Manual On" (indicated by illumination of the dial).
2. Check the position of the "Treble" control knob. When setting up or tuning in stations, this control knob should be set at the "Normal" position (pointer on knob pointing in direction of gold dot).
3. Set the Range switch control knob to the "Broadcast" position (pointer on knob pointing in direction of gold dot).
4. Remove the lists of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
5. Remove the three screws which hold the electric tuning escutcheon plate (metal plate) to the electric tuning escutcheon. Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the eight stars are printed.
6. From the lists of stations, remove the call letters of the eight stations which it is desired to set up for electric tuning. These eight stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

**CAUTION:** When setting up these stations it is necessary to see that the separation of these stations on the dial is sufficient to allow adjacent "Adjustable Station Brushes" to be properly located in the adjusting slot.

It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these eight favorite stations, the following order should be followed:

Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining seven stations into the other seven squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

After the eight station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the three screws.

The tuning adjustments for the eight favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. With the Range switch control knob set to the "Broadcast" position, and the "Manual On" button pushed in, tune the receiver in the conventional manner by means of the "Manual Stations" (Station Selector) control knob to that station having the highest frequency.

**IMPORTANT:** When manually tuning in a station, or when setting up a station in the electric tuning system, exact resonance with the desired station should always be obtained by observing the tuning indicator.

8. Facing the rear of the receiver, it will be observed that the commutator assembly located on the rear of the gang tuning capacitor has a calibrated dial and dial pointer. After manually tuning in the favorite broadcast station as mentioned in paragraph 7 above, it will be seen that the commutator dial's pointer also indicates the frequency of the station; now, slide the "Adjustable Station Brush" (which is nearest to the high frequency end of the commutator dial) in the slot until it is directly in line (and centered) with the end of the commutator's dial pointer.
9. Now, in successive order, according to frequency, proceed to set up the remaining seven favorite stations in the same manner as was mentioned in paragraphs 7 and 8 above for the favorite station having the highest frequency.

When the eight adjustable station brushes have all been set up for the eight stations, the brush nearest to the low frequency end of the commutator's dial should be set at the frequency of the station having the lowest frequency.

10. After the eight favorite stations' brushes have all been positioned in the commutator's slot as mentioned in paragraphs 7, 8, and 9 above, loosen about one turn, the clamping screw of the tuning indicator. Remove the tuning indicator unit (with its clamp) from its metal bracket and allow the unit to rest on the chassis base with the end of the tuning indicator tube facing the rear of the receiver.
11. Repeat the operation mentioned in paragraph 7 above, for the favorite station having the highest frequency, being careful to obtain exact resonance with this station by means of the tuning indicator.

When resonance with this station is obtained, watch the aperture appearing on the target of the tuning indicator tube and push in the button which is located under the station's letters (dial illumination ceases and station letters become illuminated). If the aperture of the tuning indicator changes, move

the adjustable station brush slightly in either direction and recheck for resonance by switching back to manual tuning. Repeat this process until the condition is obtained where there is no change in the aperture of the tuning indicator tube when the station is switched from manual to electric tuning.

12. Proceed to check the settings of the adjustable station brushes for the remaining seven chosen stations according to frequency in exactly the same manner as mentioned in 11, above.

When this has been accomplished, again mount the tuning indicator unit into its proper operating position. This completes the operations necessary for setting up the eight favorite stations.

**IMPORTANT:** With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the eight favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the electric tuning unit, it will be found that the automatic frequency control circuit will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

## REMOTE TUNING CONTROL

Stromberg-Carlson has prepared a "Remote Tuning Control Unit" which may be easily installed on these receivers by your dealer or service man. The use of this unit enables one to select any one of the eight favorite stations which have been set up in the electric tuning system at a distance from the receiver, up to the length of the attachment cable. In addition to the push buttons for the control of the eight favorite stations, two push buttons are also included for controlling the volume.

These units, with all accessories and instructions, are available as complete package assemblies. There are two different package assemblies; P-29871 package assembly which is for use on these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles, and P-29782 package assembly which is for use on these receivers designed for operation on a power supply having a frequency of 25 cycles.

## OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

These receivers are equipped with a three-contact phonograph socket located in the center of the metal shield which covers the push button switches and is visible from the rear of the receiver. A three-prong plug is also furnished for connecting the pick-up cable to the phonograph socket.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

To switch the radio receiver's circuits from radio reproduction to phonograph reproduction, it is only necessary to push in the push button located under the designation, "Phono On". The Record Player's turntable switch should then be pushed to the "on" position. When the turntable has attained speed, raise the pick-up and lower it gently on to the record so that the needle point enters the outside groove. The volume and the bass response for phonograph reproduction can be controlled the same as for radio reception, i. e., by means of the "VOLUME" and "BASS" control knobs located on the front panel of the radio receiver. The treble response may also be varied by means of the control marked "TREBLE", which is located on the front panel of the radio receiver. However, when operating the phonograph unit this "TREBLE" control is effective only between the "NORMAL" position and its maximum counter-clockwise position; rotating this control knob in a clockwise direction from the normal position will not produce any change in the tone of the phonograph reproduction.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a shielded cable between the three-prong plug and the pick-up. For best reproduction, this shielded cable should be of the low capacity type. The length of this shielded cable should be kept as short as possible. To connect the shielded cable to the three-prong plug, remove the metal cover of the plug and solder the shield of the cable to that prong which is farthest away from the other two prongs; a short connecting wire must also be soldered from this prong to the upper right-hand prong when looking at the rear of the plug, that is, the side opposite to the prong side. The inside wire conductor of the shielded cable should then be soldered to the other terminal of the plug.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.







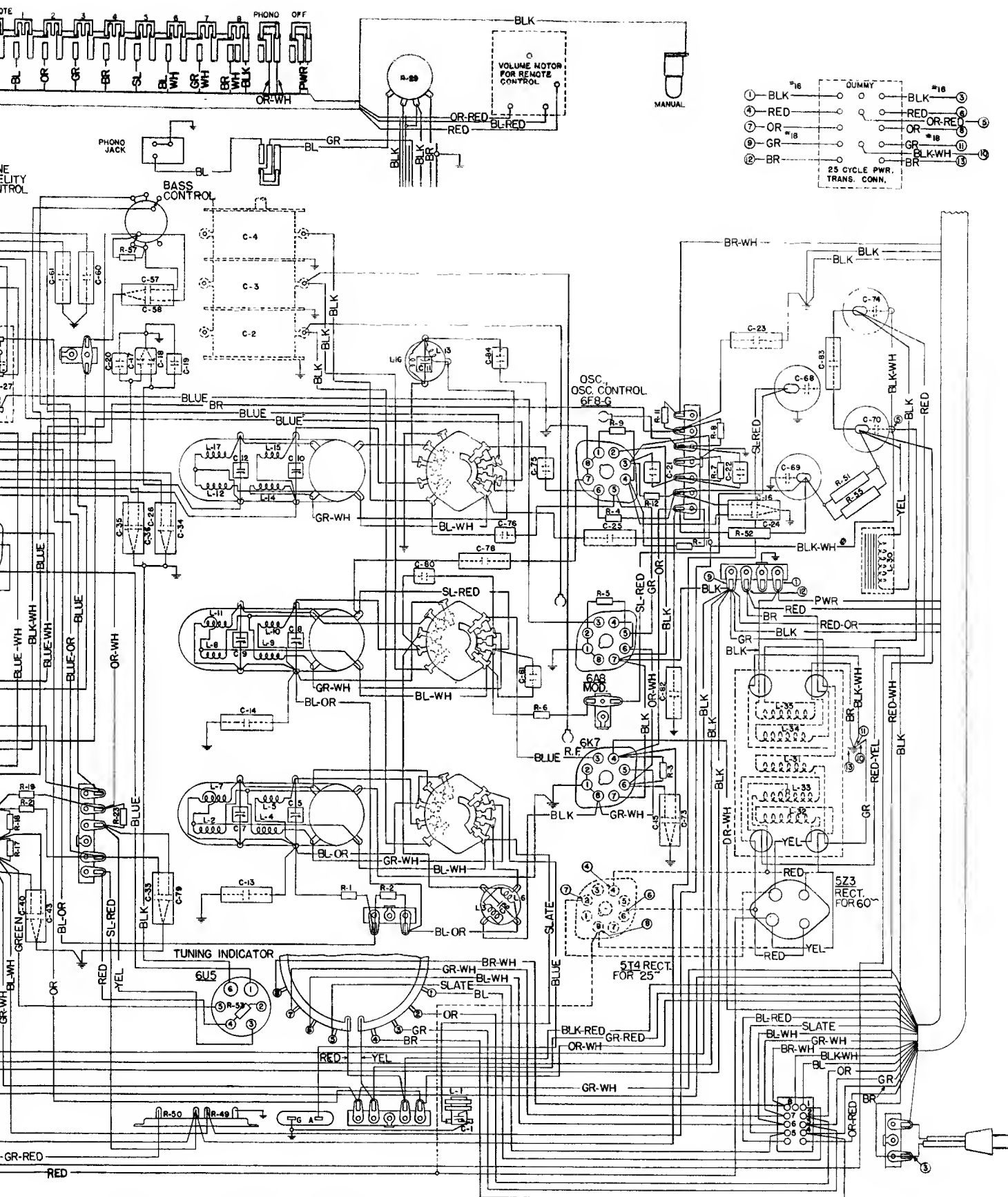


Fig. 3. Wiring Diagram of Chassis.

# REPLACEMENT PARTS

Piece Number	Circuit Designation	Part
22775	C83 . . . . .	Capacitor, .4 Mfd.
22988	. . . . .	Socket, 4 Prong
23517	. . . . .	Socket, 7 Prong
24402	C52, C60 . . . . .	Capacitor, .1 Mfd.
24405	C13, C14, C23, C39, C50, C55, C65, C66, C71 . . . . .	Capacitor, .04 Mfd.
24994	C78 . . . . .	Capacitor, .05 Mfd.
25149	C25 . . . . .	Capacitor, .01 Mfd.
25488	C20, C63 . . . . .	Capacitor, Type W, .002 Mfd.
25526	R51, R55 . . . . .	Resistor, Type F, 15,000 Ohms
25539	. . . . .	Socket 8 Prong
26260	L30 . . . . .	"B" Choke Assembly
26322	R11 . . . . .	Resistor, Type E, 120 Ohms
26326	R36 . . . . .	Resistor, Type E, 270 Ohms
26328	R7 . . . . .	Resistor, Type E, 390 Ohms
26332	R14 . . . . .	Resistor, Type E, 820 Ohms
26333	R6, R13, R54 . . . . .	Resistor, Type E, 1000 Ohms
26334	R22 . . . . .	Resistor, Type E, 1200 Ohms
26335	R33 . . . . .	Resistor, Type E, 1500 Ohms
26336	R31 . . . . .	Resistor, Type E, 1800 Ohms
26337	R40 . . . . .	Resistor, Type E, 2200 Ohms
26338	R32 . . . . .	Resistor, Type E, 2700 Ohms
26341	R3 . . . . .	Resistor, Type E, 4700 Ohms
26345	R4, R34, R38 . . . . .	Resistor, Type E, 10,000 Ohms
26347	R41 . . . . .	Resistor, Type E, 15,000 Ohms
26349	R12 . . . . .	Resistor, Type E, 22,000 Ohms
26350	R30 . . . . .	Resistor, Type E, 27,000 Ohms
26353	R5, R25, R39, R42 . . . . .	Resistor, Type E, 47,000 Ohms
26355	R35 . . . . .	Resistor, Type E, 68,000 Ohms
26357	R1, R2, R15, R56 . . . . .	Resistor, Type E, .1 Megohm
26362	R45 . . . . .	Resistor, Type E, .27 Megohm
26363	R18 . . . . .	Resistor, Type E, .33 Megohm
26365	R8, R26 . . . . .	Resistor, Type E, .47 Megohm
26369	R16, R21 . . . . .	Resistor, Type E, 1 Megohm
26373	R23, R24 . . . . .	Resistor, Type E, 2.2 Megohm
26497	. . . . .	Tuning Indicator Cable Assembly
26677	. . . . .	Phono. Socket Plug
26678	. . . . .	Phono Socket
26775	R47 . . . . .	Resistor, Type F, 20,000 Ohms
26776	R52 . . . . .	Resistor, Type F, 12,000 Ohms
26778	C62 . . . . .	Capacitor, Type W, .005 Mfd.
27009	C22 . . . . .	Capacitor, Type O, 500 Mmfd.
27081	C1 . . . . .	Aligning Capacitor, Wave Trap
27108	C15, C16, C24, C26, C33, C34, C35, C36, C41, C47, C51, C73, C77, C79 . . . . .	Capacitor Assembly (2—.05 Mfd.)
27125	R48 . . . . .	Resistor, Type F, 25,000 Ohms
27134	L26, L27 . . . . .	Output Transformer
27305	C42, C46, C76 . . . . .	Capacitor, Type O, 50 Mmfd.
27341	R46 . . . . .	Resistor, 200 Ohms
27610	R29 . . . . .	Volume Control
27646	C67 . . . . .	Capacitor, .002 Mfd.
27773	. . . . .	Fidelity Control Switch
27921	C7, C10, C11 . . . . .	H. F. Aligners, Oscillator "B" and "C" Ranges, Antenna "A" Range
27999	C48, C49 . . . . .	Capacitor Assembly, Type W (2—50 Mmfd.)
28002	C61, C62 . . . . .	Capacitor, .25 Mfd.
28004	R44 . . . . .	Resistor, Type E, .27 Megohm
28025	. . . . .	Pilot Lamp
28652	. . . . .	Cord (Power Supply)
28805	C5, C12 . . . . .	H. F. Aligners, Oscillator "A" Range, Antenna "C" Range
28841	C84 . . . . .	Capacitor, Type W, 1500 Mmfd.
29012	C44, C45 . . . . .	Capacitor, 100 Mmfd.
29033	L1 . . . . .	Coil Assembly, Wave Trap
29064	C19 . . . . .	Capacitor, 200 Mmfd.
29118	C70 . . . . .	Electrolytic Capacitor, 16 Mfd.
29119	C68 . . . . .	Electrolytic Capacitor, 16 Mfd.
29120	C69 . . . . .	Electrolytic Capacitor, 16 Mfd.
29121	C74 . . . . .	Electrolytic Capacitor, 16 Mfd.
29122	C59, C64, C72 . . . . .	Electrolytic Capacitor, 10 Mfd., 35 Volts; 4 Mfd., 300 Volts; 4 Mfd., 450 Volts
29161	. . . . .	Commutator Assembly for Electric Tuning Selector
29189	. . . . .	Remote Control Socket
29192	R49, R50 . . . . .	Resistor, "B" Voltage Divider
29197	L31, L32, L33, L34, L35 . . . . .	Power Transformer (50 to 60 Cycles Chassis)
29198	L31, L32, L33, L34, L35 . . . . .	Power Transformer (25 to 60 Cycles Chassis)
29201	. . . . .	Range Switch
29202	L12, L14, L15, L17 . . . . .	Oscillator Transformer, "A" and "C" Ranges
29203	L13, L16 . . . . .	Oscillator Transformer, "B" Range
29204	L8, L9, L10, L11 . . . . .	R. F. Transformers, "A" and "C" Ranges
29205	L2, L4, L5, L7 . . . . .	Antenna Transformer, "A" and "C" Ranges

## REPLACEMENT PARTS—Continued

Piece Number	Circuit Designation	Part
29206	L3, L6 . . . . .	Antenna Transformer, "B" Range
29207	C17, C18 . . . . .	L. F. Aligners, Oscillator "A" and "C" Ranges
29209	L18, L19 . . . . .	First I. F. Transformer
29209	L20, L21 . . . . .	Second I. F. Transformer
29210	L23, L24, L25 . . . . .	Third I. F. and Discriminator Transformer
29211	C27, C28, C37, C38 . . . . .	Capacitor, 300 Mmfd.
29215	C2, C3, C4 . . . . .	Gang Tuning Capacitors Assembly
29219	. . . . .	Flexible Coupling for Gang Tuning Capacitor
29233	. . . . .	Motor for Electric Tuning (50-60 Cycles Chassis Only)
29242	. . . . .	Tuning Drive Pulley
29248	. . . . .	Pulley for Dial Pointer's Slider
29253	. . . . .	Pulley for Range Switch Shaft
29254	. . . . .	Dial
29266	. . . . .	Bronze Wire Cable for Pointer's Slider
29268	C40, C43 . . . . .	Capacitor (2—.25 Mfd.)
29269	C54 . . . . .	Capacitor, Type W, .003 Mfd.
29277	. . . . .	Pilot Lamp Sockets Assembly for Station Letters
29278	. . . . .	Pilot Lamp Sockets Assembly for Push Buttons
29279	. . . . .	Pilot Lamp Socket Assembly for Tuning Dial
29280	. . . . .	Bass Control Switch
29282	C21 . . . . .	Capacitor, Type O, 150 Mmfd.
29283	C80 . . . . .	Capacitor, Type O, 15 Mmfd.
29284	C75 . . . . .	Capacitor, Type W, .001 Mfd.
29285	C29, C30, C31, C32 . . . . .	Capacitor, Type W, .006 Mfd.
29286	C81 . . . . .	Capacitor, Type O, 300 Mmfd.
29288	. . . . .	Electric Tuning Cable Assembly
29358	R10 . . . . .	Resistor, Type EB, 18,000 Ohms
29558	R9 . . . . .	Resistor, Type E, 1200 Ohms
29559	C53 . . . . .	Capacitor, Type W, .0025 Mfd.
29561	C6, C8, C9 . . . . .	H. F. Aligners, R. F., "A" and "C" Ranges, Antenna "B" Range
29627	. . . . .	Spring for Range Indicator
29628	. . . . .	Spring for Tuning Drive Cord
29633	. . . . .	Dial Pointer and Slider Assembly
29714	. . . . .	Motor for Electric Tuning (25 Cycles Chassis Only)
29727	. . . . .	Spring for Bronze Wire Cable (2 Required)

### MISCELLANEOUS PARTS

27628	. . . . .	Felt Washer (one required between each Control Knob and Cabinet)
27800	. . . . .	Knob. Used on "Volume" and "Manual Stations" Control Shafts
27801	. . . . .	Knob. Used on "Treble", "Bass" and "Ranges" Control Shafts
.....	. . . . .	Black Cord for Tuning Drive